TITLE OF THE INVENTION

Electric Compressor

BACKGROUND OF THE INVENTION

The present invention relates to an electric compressor for a refrigeration cycle used in an automotive air conditioner to compress a refrigerant.

Japanese Laid-Open Utility Model Publication No. 62-12471 and Japanese Laid-Open Patent Publication No. 2002-5024 each describe an electric compressor having an inverter, which drives an electric motor, attached to an outer surface of a compressor housing, which houses a compression mechanism. To cope with the heat generated from the inverter, in Japanese Laid-Open Utility Model Publication No. 62-12471, the low temperature refrigerant flowing through the electric compressor exchanges heat with a switching device, which forms the inverter, through the compressor housing. Such a structure is advantageous in that a mechanism for cooling the inverter, such as a radiator or a fan, is not required.

However, Japanese Utility Model Publication No. 62-12471 only describes that the switching device is attached to, or contacts, the outer surface of the electric compressor housing. There is no disclosure of how to improve the heat exchange efficiency between the compressor housing and the switching device.

When the inverter is attached to the compressor, part of the inverter projects outward from the compressor housing. This enlarges the electric compressor. Space is limited when installing the compressor in an automobile. Thus, enlargement of the compressor must be avoided. To keep the electric compressor compact, the height of the part of the inverter projecting from the compressor housing must be lowered. Among the electric components included in the inverter, a plurality of large electrolysis capacitors are used in a smoothening circuit. To lower the height of the projecting part of the inverter, the layout of electrolysis capacitors must be changed. However, in the prior art, sufficient consideration has not been given to the layout of the electrolysis capacitors.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide an electric compressor that is compact and increases the efficiency for exchanging heat between the switching device and the compressor housing.

To achieve the above object, the present invention provides an electric compressor for use in a refrigeration circuit. The electric compressor includes a housing having an outer surface, an electric motor, and a compression mechanism accommodated in the housing for being driven by the electric motor. An inverter is attached to the outer surface of the housing to drive the electric motor. The inverter includes a switching device having a heat radiating surface. A groove having a wall is formed in the outer surface of the housing. The switching device is inserted in the groove so that the heat radiating surface contacts the wall of the groove.

A further aspect of the present invention is an electric compressor including a housing having a cylindrical wall with an outer surface and an axis, an electric motor, and a compression mechanism accommodated in the housing. When operated, the compression mechanism is driven by the electric motor. An inverter is attached to the outer surface of the cylindrical wall to drive the electric motor. The inverter includes a plurality of cylindrical electrolysis capacitors, each having an axis. The axes of the electrolysis capacitors are parallel to one another and parallel to the axis of the cylindrical wall.

Other aspects and advantages of the present invention will become apparent from the following description, taken in conjunction with the accompanying drawings, illustrating by way of example the principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention, together with objects and advantages thereof, may best be understood by reference to the following description of the presently preferred embodiments together with the accompanying drawings in which:

Fig. 1 is a cross-sectional view of an electric compressor according to a preferred embodiment of the present invention;

Fig. 2 is a side view showing the electric compressor;

Fig. 3 is a cross-sectional view taken along line 3-3 in Fig. 2;

Fig. 4 is an exploded perspective view showing a switching device assembly of the electric compressor;

Fig. 5 is an exploded perspective view showing electrolysis capacitors of the electric compressor;

Fig. 6 is a cross-sectional view of a switching device assembly in another embodiment of the present invention; and

Fig. 7 is a cross-sectional view of a switching device assembly in a further embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

An electric compressor 10 according to a preferred embodiment of the present invention will now be discussed with reference to Figs. 1 to 5. The electric compressor 10 is incorporated in a refrigeration cycle of an automotive air conditioner.

Referring to Figs. 1 and 2, the electric compressor 10 has a compressor housing 11 including a first housing member 21 and a second housing member 22. The first housing member 21, which is an aluminum alloy casting, has a cylindrical wall 23. The second housing member 22 is also an aluminum alloy casting. The first housing member 21 and the second housing member 22 are coupled to each other to define a hollow portion 24 in the compressor housing 11.

As shown in Fig. 1, a rotary shaft 27 is rotatably supported in the first housing member 21. An axis L of the rotary shaft 27 coincides with an axis of the electric compressor 10. The cylindrical wall 23 extends around the rotary shaft 27 so that the axis of the cylindrical wall 23 coincides with the axis L of the rotary shaft 27.

An electric motor 25 and a compression mechanism 26 are accommodated in the hollow portion 24. The electric motor 25 includes a stator 25a, which is fixed to an inner surface 23a of the cylindrical wall 23, and a rotor 25b, which is arranged on the rotary shaft 27 radially inward from the stator 25a. The electric motor 25 rotates the rotary shaft 27 with power supplied from the stator 25a.

As shown in Fig. 2, the first housing member 21 has a suction port 31. The second housing member 22 has a discharge port 32. An external refrigeration circuit 61, which includes a condenser 62, an expansion valve 63, and an evaporator 64, connect the suction port 31 and the discharge port 32. The external refrigeration circuit 61 and the electric compressor 10 form the refrigeration cycle of the automotive air conditioner.

As shown in Fig. 1, the compression mechanism 26 includes a fixed scroll 26a and a movable scroll 26b. When the rotary shaft 27 rotates, the movable scroll 26b orbits relative to the fixed scroll 26a to compress refrigerant gas. Accordingly, when the electric motor 25 drives the compression mechanism 26, low temperature, low pressure refrigerant gas is drawn into the compression mechanism 26 from the evaporator 64 through the suction port 31. The compression mechanism 26 compresses the drawn refrigerant gas to produce high temperature, high pressure refrigerant gas and sends the refrigerant gas to the condenser 62 through the discharge port 32.

Referring to Fig. 3, the first housing member 21 includes a retainer 36 projecting from a part of the outer surface 23b of the cylindrical wall 23. The retainer 36 includes side walls 37, which extend integrally from the outer surface 23b of the cylindrical wall 23, and a cover 38, which is fixed to the top of the side walls 37 to cover the opening of the side walls 37. A retaining chamber 35 is defined in the retainer 36.

The retaining chamber 35 has a bottom surface 35a, which is part of the outer surface 23b of the cylindrical wall 23. The retaining chamber 35 also has side surfaces 35b, which are the inner surfaces of the side walls 37. In other words, the bottom surface 35a and side surfaces 35b of the retaining chamber 35 are defined by parts of the first housing member 21. The bottom surface 35a in the retainer 36 is curved along the cylindrical wall 23. The retaining chamber 35 further has a top surface 35c, which is the inner surface of the cover 38. In the retaining chamber 35, the distance between the bottom surface 35a and the top surface 35c decreases at the middle section of the retaining chamber 35 and increases at the peripheral sections on each side (left and right sides as viewed in Fig. 3) of the retaining chamber 35.

An inverter 41, which drives the electric motor 25, is retained in the retainer 36. The inverter 41 supplies the stator 25a of the electric motor 25 with power in accordance with a command from an air conditioner ECU (not shown).

As shown in Figs. 3 to 5, the inverter 41 includes a first circuit board 42 and a second circuit board 43, which are for use in a power system, and a third circuit board 44, which is for use in a control system. A switching device assembly 70, a capacitor 46, and electric components of the power system that configure an inverter circuit (not shown), such as a transformer, are connected to the first circuit board 42. The switching device assembly 70 includes a plurality of switching devices 45 (six in the preferred embodiment).

A plurality of electrolysis capacitors 47 (five in the preferred embodiment), which are electric components of the power system configuring the inverter circuit, are mounted on the plane 43a of the second circuit board 43. The electrolysis capacitors 47 are cylindrical and configure a smoothening circuit. The smoothening circuit stabilizes the battery voltage applied to a power system circuit of the inverter 41. The electrolysis capacitors 47 occupy much space in the retaining chamber 35. Thus, the second circuit board 43 is separated from the first circuit board 42 to efficiently use the limited space in the retaining chamber 35 of the retainer 36. A driver 48 mounted on the third circuit board 44 intermittently controls the switching devices 45 in accordance with commands from, for example, the air conditioner ECU.

As shown in Fig. 3, relatively large electric components, such as the switching device assembly 70 and the capacitor 46 are connected to the lower surface 42a of the first circuit board 42. The lower surface 42a of the first circuit board 42 faces towards the bottom surface 35a of the retaining chamber 35. The third circuit board 44 is arranged between the first circuit board 42 and the cover 38 in the retainer 36. The first circuit board 42 and the third circuit board 44 are arranged in the retainer 36 in a superimposed manner. The first circuit board 42 is fixed to the compressor housing 11 by bolts (not shown). The third circuit board 44 is fixed to the first circuit board 42 by bolts (not shown).

Resin molding, such as insert molding, is performed to integrate the six switching devices 45 into the switching device assembly 70. Resin molding is performed by arranging the switching devices 45 in two rows and filling connecting resin 57 into the space between the switching devices 45 so as to connect the switching devices 45.

The six switching devices 45 of the switching device assembly 70 each include a body 45a and three terminals 45b extending from one end of the body 45a. Among the three terminals 45b, two are bent. The remaining terminal 45b extends straight from the end of the body 45a. Due to such configuration, the wiring pattern (not shown) of the circuit board 42, to which the distal portions of the terminals 45b are connected, is not dense.

The six switching devices 45 are arranged in two rows in the longitudinal direction of the switching device assembly 70. The bent terminals 45b of the switching devices 45 in each row are aligned in the longitudinal direction. The straight terminal 45b is arranged between the bent terminals 45b in each switching device 45.

As shown in Fig. 3, the switching device assembly 70 is the component that projects the most from the first circuit board 42. If a component projecting from the first circuit board 42 is arranged in the central portion of the retainer 36 where the distance between the bottom surface 35a and the top surface 35c of the retaining chamber 35 is small, the distance between the lower surface 42a of the first circuit board 42 and the outer surface of the cylindrical wall 23 must be increased. This enlarges the retainer 36, which in turn, enlarges the electric compressor 10 in the radial direction (i.e., the direction perpendicular to the axis L).

However, in the preferred embodiment, the switching device assembly 70 is connected to the first circuit board 42 at the peripheral section (left side as viewed in Fig. 3) where the distance between the bottom surface 35a and the top surface 35c of the retaining chamber 35 is large. Such arrangement of the switching device assembly 70 enables the first circuit board 42 to be positioned near the cylindrical wall 23. As a result, the size of the retainer 36 may be reduced, and the electric compressor 10 may be made more compact.

The arrangement of the switching device assembly 70, which is a projecting component, in one side of the retaining chamber 35 provides a relatively large space from the middle portion of the retaining chamber 35 to the other side (right side as viewed in Fig. 3) of the retaining chamber 35 between the first circuit board 42 and the bottom surface 35a of the retaining chamber 35. In this space, the electrolysis capacitors 47, which occupy much space, are arranged in a row in the circumferential direction of the cylindrical wall 23. Accordingly, the layout of the switching device assembly 70 in one side of the retainer 36 not only enables the size of the electric compressor 10 to be reduced in the radial direction but also enables efficient usage of the space in the retainer 36.

As shown in Figs. 3 and 5, the plane 43a of the second circuit board 43 is perpendicular to the axis L of the compressor housing 11. As a result, the axes of the parallel electrolysis capacitors 47 are parallel to the axis L of the compressor housing 11.

The second circuit board 43 has a flat surface and a bent portion at the middle in correspondence with the bottom surface 35a of the retaining chamber 35. The five electrolysis capacitors 47 are connected to the second circuit board 43 in a manner forming a line that is bent at the middle so as to follow the curve of the bottom surface 35a.

A resin capacitor holder 49 fixes the five electrolysis capacitors 47 to the compressor housing 11. The capacitor holder 49 has five holding portions 49a to hold the five electrolysis capacitors 47. The capacitor holder 49 is formed so that the line defined by the holding portions 49a is bent at the middle in accordance with the bent line of the electrolysis capacitors 47.

When the electrolysis capacitors 47 are held in the holding portions 49a, the capacitor holder 49 is fastened to the compressor housing 11 by bolts 60 (refer to Fig. 5). This holds the electrolysis capacitors 47 between the capacitor holder 49 and the bottom surface 35a of the retaining chamber 35.

A resin sheet 50 is arranged on the bottom surface 35a of the retaining chamber 35 to separate the bottom surface 35a from the capacitor 46 and the electrolysis capacitors 47. The sheet 50 may be made of rubber as long as it has superior elastic and heat conducting properties. That is, the capacitor 46 and the electrolysis capacitors 47 indirectly contact the bottom surface 35a of the retaining chamber 35 by means of the sheet 50.

As shown in Figs. 3 and 4, a groove 51 is formed in the outer surface 23b of the cylindrical wall 23 of the compressor housing 11 in the retaining chamber 35. More specifically, a first wall 52 and a second wall 53, which are parallel to the axis L, define the groove 51. The side wall 37 of the retainer 36 that is located near the switching device 45 serves as the first wall 52. The second wall 53 is extended from the outer surface 23b of the cylindrical wall 23 in the retainer 36. A part of the outer surface 23b of the cylindrical wall 23 (bottom surface 35a of the retaining chamber 35) functions as a bottom surface 51a of the groove 51, which connects the first wall 52 and the second wall 53.

As shown in Fig. 4, an inner surface 52a of the first wall 52 faces towards an inner surface 53a of the second wall 53 in the groove 51. The inner surfaces 52a and 53a of the first and second walls 52 and 53 are inclined relative to a vertical line S, which is perpendicular to a horizontal plane extending through the axis L of the rotary shaft 27 as viewed in Fig. 3.

The switching devices 45 each have a heat radiating surface 45c, which is faced to the associated inner surface 52a or 53a of the groove 51. In other words, the switching device assembly 70 has six heat radiating surfaces 45c, three on each side of the switching device assembly 70 (Fig. 4).

The heat radiating surface 45c is the surface of the body 45a from which a conducting portion of a transistor, which forms the switching device 45, is exposed. The conducting portion is encircled in each heat radiating surface 45c in Fig. 4.

When the switching device assembly 70 is received in the groove 51, the heat radiating surface 45c of each switching device 45 contacts the corresponding inner surface 52a or 53a of the groove 51. More specifically, in the row of the three switching devices 45 that are closer to the first wall 52, the heat radiating surfaces 45c contact the inner surface 52a of the first wall 52. Further, in the row of the three switching devices 45 that are closer to the second wall 53, the heat radiating surfaces 45c contact the inner surface 53a of the second wall 53.

An elastic sheet 54 is arranged between the heat radiating surfaces 45c of the switching devices 45 and the inner surfaces 52a and 53a of the groove 51. The elastic sheet 54 is made of rubber or resin. Further, the sheet 54 has a superior heat conducting property.

When the switching device assembly 70 is received in the groove 51, a flat fastening plate 55 is fixed to the compressor housing 11 to cover the opening of the groove 51. The fastening plate 55 functions as a fastening member and a pressure applying body.

The lower surface of the fastening plate 55 (as viewed in Fig. 3) presses the switching device assembly 70 in a direction parallel to the vertical line S. As described above, the heat radiating surfaces 45c of the switching device 45 and the inner surfaces 52a and 53a of the groove 51 are inclined relative to the vertical line S. Accordingly, when the fastening plate 55 presses the switching device assembly 70 in the direction parallel to the vertical line S, the heat radiating surfaces 45c of the switching devices 45 are pressed strongly against the inner surfaces 52a and 53a of the groove 51 through the sheet 54. In the preferred embodiment, the fastening plate 55 functions to press the switching devices 45 against the inner surfaces 52a and 53a of the groove 51.

As shown in Fig. 4, a plurality of insertion holes 55a are extend through the fastening plate 55. The terminals 45b of the switching devices 45 are inserted through the corresponding insertion holes 55a. Then, the fastening plate 55 is fastened to the compressor housing 11 by bolts 58. After the first circuit board 42 is fixed to the compressor housing 11, the terminals 45b projecting out of the insertion holes 55a of the fastening plate 55 are soldered.

Referring to Figs. 1 to 3, a refrigerant gas passage 33 connecting the suction port 31 to the compression mechanism 26 passes by the groove 51 in the compressor housing 11. More specifically, the refrigerant gas passage 33 is defined between the inner surface 23a of the cylindrical wall 23 and the outer surface of the stator 25a of the electric motor 25 at a location corresponding to the groove 51. The refrigerant gas passage 33 extends parallel to the axis L of the rotary shaft 27.

The low temperature refrigerant gas directed toward the compression mechanism 26 from the suction port 31 flows through the refrigerant gas passage 33 to cool the switching devices 45. Heat exchange between the switching devices 45 and the cooler cylindrical wall 23 is performed mainly at locations where the heat radiating surfaces 45c of the switching devices 45 contact the corresponding inner surfaces 52a and 53a of the groove 51.

The preferred embodiment has the advantages described below.

(1) The groove 51 is formed in the outer surface 23b of the compressor housing 11. In other words, the bottom surface 51a and inner surfaces 52a and 53a of the groove 51 are provided by the compressor housing 11, the temperature of which is low. Accordingly, the compressor housing 11 cools the switching devices 45 more easily in comparison to, for example, when the switching devices 45 are arranged outside the groove 51. This improves the heat exchange efficiency between the switching device 45 and the compressor housing 11 in comparison to the heat exchange described in, for example, Japanese Laid-Open Utility Model Publication No. 62-12471. Further, this cools the inverter 41 in a preferable manner, improves the durability of the inverter 41, and stabilizes the operation of the inverter 41.

(2) The fastening plate 55 connected to the compressor housing 11 presses the switching device assembly 70 against the inner surfaces 52a and 53a of the groove 51. As a result, the heat radiating surfaces 45c of the switching devices 45 come into close contact with the corresponding inner surfaces 52a and 53a of the groove 51. This improves the heat exchange efficiency between the switching devices 45 and the compressor housing 11.

(3) In comparison to when providing a groove 51 for each switching device 45, the accommodation of the switching devices 45 in the single groove 51 reduces the machining cost of the compressor housing 11.

(4) The switching device assembly 70, which is formed from the unit of the switching devices 45, is inserted in the groove 51. Accordingly, the switching devices 45 are inserted in the groove 51 at the same time by inserting the switching device assembly 70. This simplifies assembly of the electric compressor 10.

(5) The inner surfaces 52a and 53a of the groove 51 are inclined relative to the vertical line S of the groove 51 so that the distance between the inner surfaces 52a and 53a of the groove 51 decreases as the bottom surface 51a of the groove 51 becomes closer. Accordingly, the heat radiating surfaces 45c of the switching devices 45 come into close contact with the corresponding inner surfaces 52a and 53a of the groove 51 as if a wedge is inserted into the compressor housing 11. This further improves heat exchange efficiency between the switching device 45 and the compressor housing 11.

(6) The elastic sheet 54 is arranged between the heat radiating surfaces 45c of the switching devices 45 and the corresponding inner surfaces 52a and 53a of the groove 51. Accordingly, elastic deformation of the sheet 54 absorbs dimensional differences and increases contact between the heat radiating surfaces 45c of the switching devices 45 and the corresponding inner surfaces 52a and 53a of the groove 51. Further, the superior heat conductance of the sheet 54 further improves the heat exchange efficiency between the switching devices 45 and the compressor housing 11. The elastic sheet 54 also protects the switching devices 45 from impacts, or the like, applied to the compressor housing 11.

(7) In the compressor housing 11, the refrigerant gas

passage 33, which connects the low pressure side of the external refrigeration circuit 61 (the side in which the evaporator 64 is located) to the compression mechanism 26, passes by the groove 51. Accordingly, the low temperature refrigerant gas that passes by the groove 51 effectively cools the switching devices 45.

(8) The inverter 41 is retained in the retaining chamber 35 of the compressor housing 11. The bottom surface 35a and side surface 35b of the retaining chamber 35 are part of the compressor housing 11. This reduces the number of components in comparison to when preparing a retainer separately from the compressor housing 11 (e.g., when retaining the inverter 41 in a case and attaching the case to the compressor housing 11). Further, the inverter 41 is surrounded by the compressor housing 11, which has high rigidity. This is effective for protecting the inverter from external impacts.

(9) The elastic sheet 50 separates the electrolysis capacitors 47 and the capacitor 46 from the bottom surface 35a of the retaining chamber 35. Accordingly, elastic deformation of the sheet 50 absorbs dimensional differences and increases contact of the electrolysis capacitors 47 and the capacitor 46 against the bottom surface 35a of the retaining chamber 35. Further, the superior heat conductance of the sheet 50 further improves the heat exchange efficiency of the capacitors 46 and 47 with the compressor housing 11. The elastic sheet 50 also protects the capacitors 46 and 47 from impacts, or the like, applied to the compressor housing 11.

(10) The switching device assembly 70 is connected to

the first circuit board 42 after arranging the switching device assembly 70 in the groove 51. Accordingly, by adjusting the insertion of the terminals 45b of the switching devices 45 for the first circuit board 42, dimensional differences of each portion is absorbed and the heat radiating surfaces 45c of the switching devices 45 come into close contact with the corresponding inner surfaces 52a and 53a of the groove 51. This further improves heat exchange efficiency between the switching devices 45 and the compressor housing 11.

(11) The axes M of the electrolysis capacitors 47 are parallel to each other and to the axis L of the rotary shaft 27 (cylindrical wall 23). For example, in comparison to when the axes M of the electrolysis capacitors 47 are arranged in a direction perpendicular to the axis L of the cylindrical wall 23 or when the electrolysis capacitors 47 are not arranged in the same direction, the projecting height of the inverter 41 (retainer 36) from the cylindrical wall 23 is decreased. Thus, the electric compressor 10 does not have to be enlarged in the radial direction.

(12) The electrolysis capacitors 47 are arranged in a row along the outer surface 23b of the cylindrical wall 23. Accordingly, in comparison to, for example, when arranging the electrolysis capacitors 47 in a stacked manner, the projecting height of the inverter 41 (retainer 36) from the cylindrical wall 23 is decreased.

(13) The electrolysis capacitors 47 are held between the capacitor holder 49 and the cylindrical wall 23. In other words, the capacitor holder 49 fixes the electrolysis capacitors 47 to the compressor housing 11. In comparison

to, for example, when indirectly fixing the electrolysis capacitors 47 to the compressor housing 11 with the second circuit board 43, the fastening of the electrolysis capacitors 47 to the compressor housing 11 is guaranteed. This improves vibration resistance of the electrolysis capacitors 47. Thus, the electric compressor 10 of the preferred embodiment is especially desirable under harsh vibration conditions, such as in an automobile.

(14) The electrolysis capacitors 47 are connected to the second circuit board 43, which is separated from the first circuit board 42. By separating the second circuit board 43 from the first circuit board 42, freedom of layout for the second circuit board 43 increases in the compressor housing 11. In other words, freedom of layout for the electrolysis capacitors 47 increases.

(15) The electrolysis capacitors 47 are arranged between the first circuit board 42 and the cylindrical wall 23. Due to the difference in the shapes of the first circuit board 42, which is flat, and the cylindrical wall 23, which is curved, it is difficult to arrange electric components in the space between the first circuit board 42 and the cylindrical wall 23. However, in the preferred embodiment, the electrolysis capacitors 47 are arranged in the space in an orderly manner along the outer surface 23b of the cylindrical wall 23. The layout of the electrolysis capacitors 47 in the space between the first circuit board 42 and the cylindrical wall 23, which would otherwise be dead space, is extremely effective for decreasing the height that the inverter 41 projects from the cylindrical wall 23.

It should be apparent to those skilled in the art that the present invention may be embodied in many other specific forms without departing from the spirit or scope of the invention. Particularly, it should be understood that the present invention may be embodied in the following forms.

As shown in Fig. 6, the groove 51 may be formed so that its opposing inner surfaces 52a and 53a are parallel to each other. In this case, the heat radiating surfaces 45c of the switching devices 45 in the switching device assembly 71 are parallel to the vertical line S.

As shown in Fig. 7, a third wall 59 may be arranged between the first wall 52 and the second wall 53. In this case, the compressor housing 11 has two grooves 51. Three of the switching devices 45 are arranged in each of the grooves 51. A switching device assembly 72, which is formed by integrating three switching devices 45A into a switching device assembly 72 with resin, is inserted in each groove 51.

In the embodiments of Figs. 1 to 7, the sheet 54 arranged between the heat radiating surfaces 45c of the switching devices 45 and the inner surfaces 52a and 53a of the groove 51 may be eliminated. Further, the heat radiating surfaces 45c of the switching devices 45 may come into direct contact with the corresponding inner surfaces 52a and 53a of the groove 51.

Instead of bending the row of the electrolysis capacitors 47 at the middle, the row of the electrolysis capacitors 47 may be linear.

The electrolysis capacitors 47 may be stacked upon one another.

In the embodiments of Figs. 1 to 7, the capacitor holder 49 may be eliminated, and the second circuit board 43 may be fixed to the compressor housing 11 or the other circuit boards 42 or 44 by bolts. In other words, the electrolysis capacitors 47 may be indirectly connected to the compressor housing 11 through the second circuit board 43. This would decrease the number of components.

In the embodiments of Figs. 1 to 7, the second circuit board 43 may be eliminated and wires may be connected directly to the electrolysis capacitors 47. In this case, by integrating the electrolysis capacitors 47 with resin beforehand, the electrolysis capacitors 47 may easily be attached to the compressor housing 11.

In the embodiments of Figs. 1 to 7, in addition to the plane 43a of the second circuit board 43, the electrolysis capacitors 47 may be arranged on the plane on the other side of the second circuit board 43.

The present invention may be applied to an electric compressor in which the electric motor is separated from the compression mechanism. In this case, the inverter is arranged in the compressor housing, which accommodates the compression mechanism.

The present invention may be applied to an electric compressor in which the electric motor and compression mechanisms are arranged in different compressor housings. In this case, the inverter may be arranged in the compressor housing accommodating the electric motor or in the compressor housing accommodating the compression mechanism.

The present invention may be embodied in a so-called hybrid compressor, which uses an automotive drive source, or an engine, as another compressor drive source.

The compression mechanism 26 does not have to be a scroll type mechanism and may be a piston type, vane type, or helical type mechanism.

The present examples and embodiments are to be considered as illustrative and not restrictive, and the invention is not to be limited to the details given herein, but may be modified within the scope and equivalence of the appended claims.